

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	]	Confirmation No. 7555
Holland, et al.	]	
	]	
Serial No. 10/523,540	]	Examiner: G. Baldwin
	]	
Filed: February 3, 2005	]	Group Art Unit: 1775
	]	
FOR: FIRE RESISTANT GLAZING	]	Attorney Docket 1-16908
	]	

December 23, 2008

Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

DECLARATION UNDER 37C.F.R. 1.132

Dear Sir

I, John Richard Holland hereby declare and state

- 1 I am a citizen of the United Kingdom and my current address is 36 Brick Kiln Lane, Rufford, Ormskirk Lancashire L40 1SZ, United Kingdom.
- 2 I have been awarded the degrees of Bachelor of Science from the University of Wales Institute of Science and Technology and Doctor of Philosophy from Durham University. I have extensive experience in the area of fire resistant laminated glazings and in particular of glazings which comprise at least two glass panes and at least one interlayer comprising an alkali metal silicate..
- 3 I have been employed by Pilkington Group Limited since 1992 in the area of fire resistant glazings and have worked with silicates since 1996. I am currently employed in the position of Senior Technologist.
- 4 I am a named inventor of the invention claimed in the above application. I have read the rejection of the above application dated 08/27/08, the art cited as the basis for that rejection and the amended claims which are the subject of that rejection.

5 The Examiner states in the paragraph bridging pages 3 and 4 of the official action that the claimed product appears to be the same or a similar product to that disclosed in the prior art. The prior art is US Patent 4,190,698 (De Boel) and WO 2002/024445 (Varma et al). I was familiar with the disclosure of both of these prior art disclosures at the time of making the invention which is claimed in this application.

6 The disclosure of De Boel is acknowledged in the specification of this application. Specifically it is stated that "we have discovered that the addition of sodium aluminate to a waterglass solution as proposed in USP 4190698 does not produce a solution which is useful in the formation of fire resistant glazings." In order to confirm that this statement is accurate I have carried out a series of experiments repeating Examples 1 to 3 of the invention but omitting the citric acid component.

## 7. Method

Using the components detailed below a series of solutions of alkali metal silicates and sodium aluminates were mixed. The two component solutions were weighed out into beakers and mixed. The silicate containing components were mixed using a propeller stirrer and the aluminate/glycerol mixtures stirred with a magnetic follower. Component 2 was then added to component 1 dropwise using a Pasteur pipette, using a stirring speed sufficient to create a deep vortex into which to drop the aluminate solution to ensure rapid dispersion. One series of solutions was prepared with the glycerol initially mixed with silicate, a second with glycerol mixed with the aluminate.

## 8 Appendix

Solutions used to prepare mixtures

Sodium silicate1:	ratio $\text{SiO}_2:\text{NaO}_2 = 2.85:1$	solids = 40%
Sodium silicate2:	ratio $\text{SiO}_2:\text{NaO}_2 = 3.3:1$	solids = 37%
Sodium silicate3:	ratio $\text{SiO}_2:\text{NaO}_2 = 3.9:1$	solids = 28%
Potassium silicate1:	ratio $\text{SiO}_2:\text{NaO}_2 = 1.43:1$	solids = 52.4%
Sodium aluminate1:	ratio $\text{SiO}_2:\text{NaO}_2 = 1:1.5$	solids = 38%
Glycerol:	87% aqueous solution	

## 9 Results

	Mix method 1		Mix method 2	
	Component 1	Component 2	Component 1	Component 2
Example 1	Sodium silicate1: 151.7g	Sodium aluminate: 8.86g	Sodium silicate	Sodium aluminate: 8.86g
	Potassium silicate: 44.3g		Potassium silicate	Glycerol: 20.5g
	Glycerol: 20.5g			
Result	An opaque pasty solution was produced.		An opaque pasty solution was produced.	
Example 2	Sodium silicate2: 100g	Sodium aluminate: 2g	Sodium silicate	Sodium aluminate: 2g
	Glycerol: 10g			Glycerol: 10g
Result	Opaque suspension, precipitated on standing		Opaque suspension, precipitated on standing	
Example 3	Sodium silicate2: 100g	Sodium aluminate: 3g	Sodium silicate	Sodium aluminate: 3g
	Glycerol: 10g			Glycerol: 10g
Result	Viscous opaque suspension, precipitated very slowly.		Viscous opaque suspension, precipitated very slowly.	
Example 4	Sodium silicate3: 100g	Sodium aluminate: 1g	Sodium silicate	Sodium aluminate: 1g
	Glycerol: 7g			Glycerol: 7g
Result	Opaque suspension, precipitated on standing		Opaque suspension, precipitated on standing	

10 These experimental results support the statement in the application which is quoted in paragraph 6 above. The Examples which form part of the application show that the addition of citric acid to these formulations leads to the formation of a clear solution which can be dried to form a clear interlayer useful as a component of a fire resistant glazing.

11 I am a named inventor of the application which is cited as the Varma prior art. Varma discloses the advantages which accrue from the addition of certain hydroxy carboxylic acids including citric acid to an aqueous silicate solution in the production of fire resistant glazings. Varma is silent as to the incorporation of multivalent metal ions into the silicate solution. The solutions and interlayers disclosed by Varma can be clearly seen to be different from those disclosed in the present application.

12 The Examiner rejects the claims of this application as being obvious over De Boel in view of Varma. This rejection is based upon what is asserted to be a

misunderstanding of the claimed invention. In the art of fire resistant glazing there has long been a belief that the incorporation of multivalent metal ions would lead to an interlayer which would exhibit improved fire resistant properties. This is reflected by the statement at column 3 line 7 of De Boel "sodium aluminate has a favourable effect in that it also increases the refractiveness of the layer." This belief persisted in the art as can be seen in the disclosure of US Patent 5,766,770 (Nolte) at column 3 line 14 which states: "It has been found to be advantageous to introduce sub microscopic particles of at least one inorganic compound of Si, Al, Ti or Zr for increasing the viscosity of said layer upon foaming thereof in case of exposure to a fire". Neither De Boel or Nolte provide a disclosure which enables this belief to be practiced. As demonstrated by the experiments reported above simply following the teaching of De Boel leads to the formation of a turbid interlayer which is of no value.

13 It is well documented in scientific and patent literature, dating back at least to the early part of the 20<sup>th</sup> century, that the addition of aluminium compounds dramatically reduces the solubility of silicates. Synthetic zeolitic minerals can be produced simply by mixing sodium silicate and sodium aluminate in a wide range of ratios and concentrations. This is the inevitable result if the teaching of De Boel is followed. These materials have extremely low solubility in aqueous solutions so a precipitate will be the result. It is therefore evident that these experiments were never carried out.

14 It is respectfully submitted that the present invention overcomes this difficulty. It provides a method by which aluminium ions can be incorporated into a clear silicate based interlayer which comprises partially neutralizing sodium aluminate using a hydroxy carboxylic acid such as citric acid. Varma does not address this problem of incorporating a multivalent metal ion into the silicate. There is no motivation for one skilled in the art to look to Varma in order to solve the problem of incorporating multivalent metal ions.

15 I declare further that all statements made of my own knowledge are true and that all statements made on information of belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment or both under Section 1001 of the United States Code, and that such wilful false statements may jeopardize the validity of the application or any patent issuing thereon

Date 23 December 2008

  
John R Holland